Evaluating the Uncertainty of Long-Term Soil Moisture Datasets across Texas

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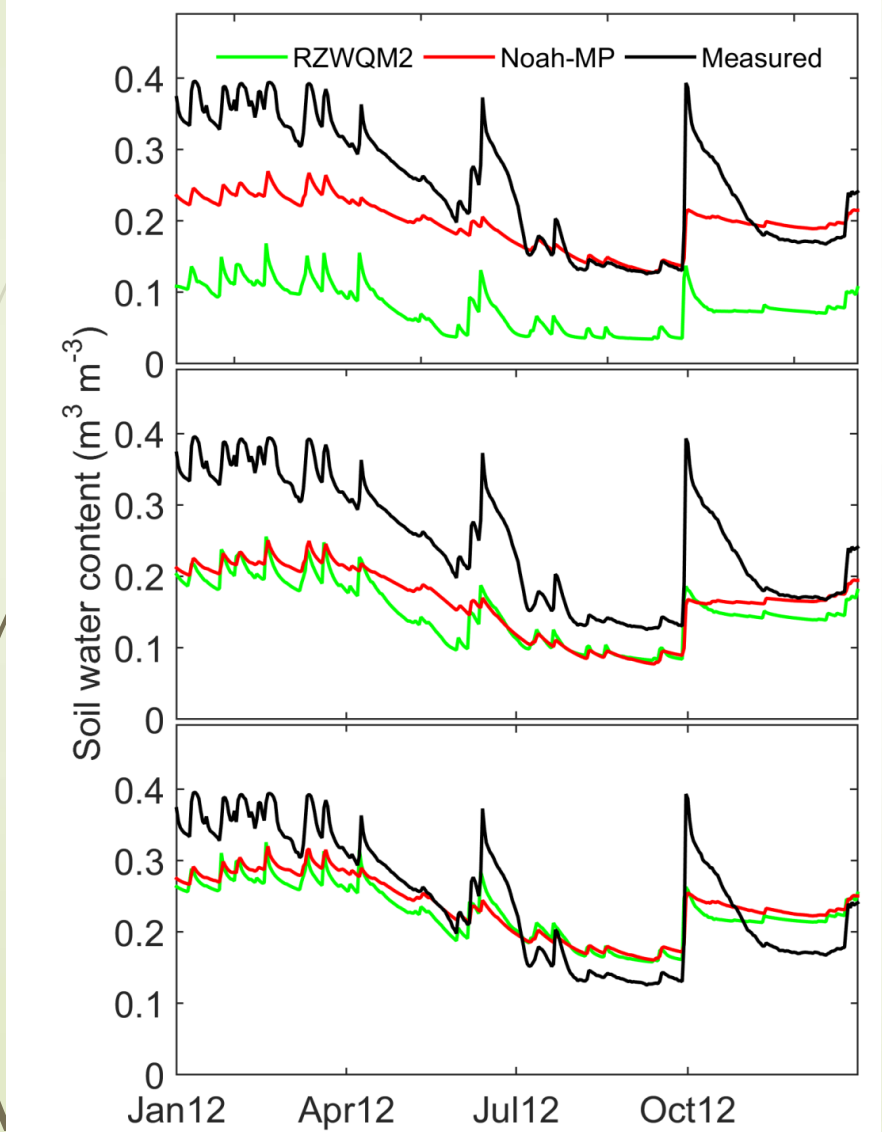
JUSTIFICATION



How do we compare our models to the long-term measurements?

1. How accurate is this data?
2. Is there a bias from lack of calibration?
3. Does data "go bad" in high clay soil in dry conditions
4. CONFIDENCE INTERVALS?

Overall Goal

Assess the uncertainty in long term soil moisture measurements

- Specific goals
  - Provide accuracy confidence intervals for SCAN Hydra Probe measurements
  - Best method for ”calibrating” Hydra Probe
  - Define accuracy of uncalibrated Hydra Probe

Measuring Water Content

- Pull volumetric cores in the field (GOLD STANDARD)
  - destructive(one point in time)

- Use a neutron moisture meter
  - Non destructive (one point in time)

- Use a capacitance-type soil moisture probe
  - Non destructive, continuous in time

HydraProbe

Experimental Design

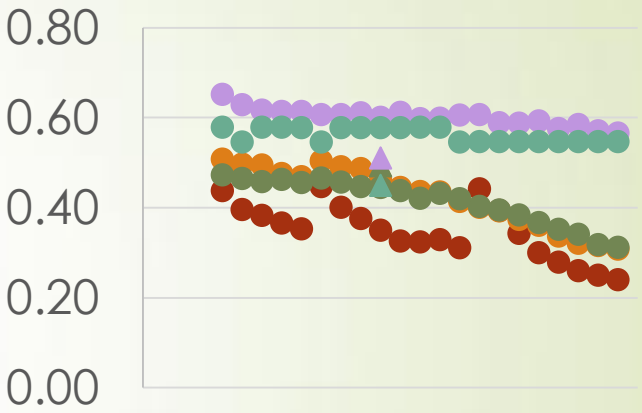
Hydra Probe Quality Over Time

2 Soils Ships

Silawa

Hydra Probes

Neutron Probe data

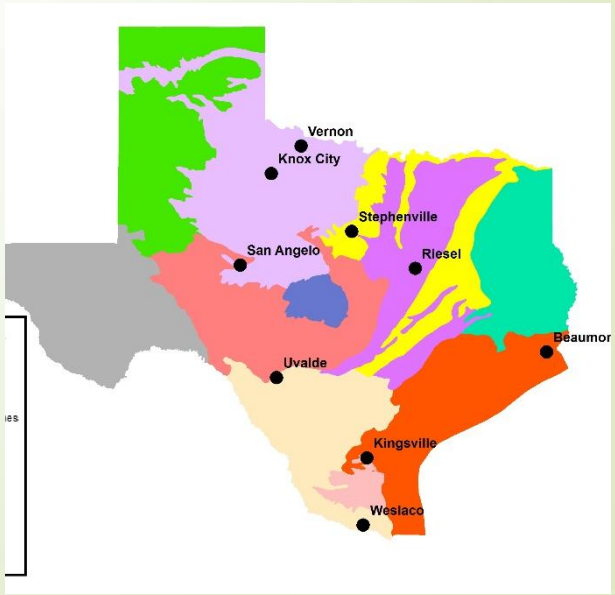


Hydra Probe Quality Over Soils

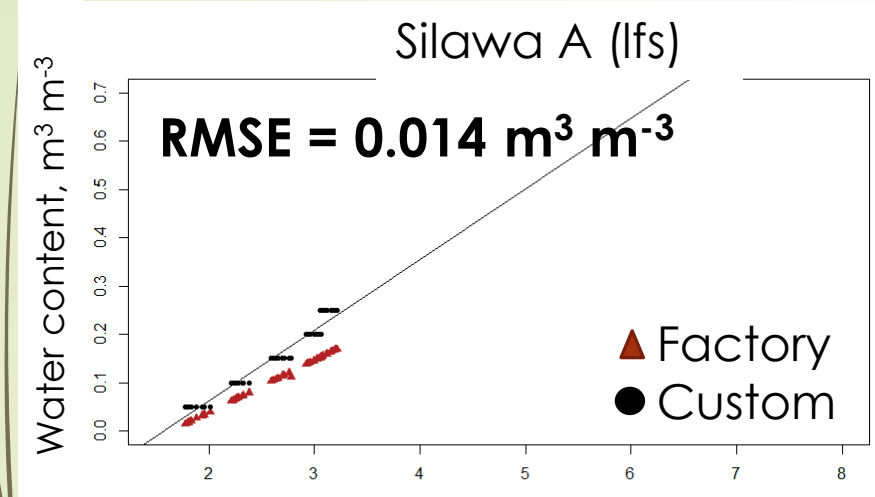
11 Soils

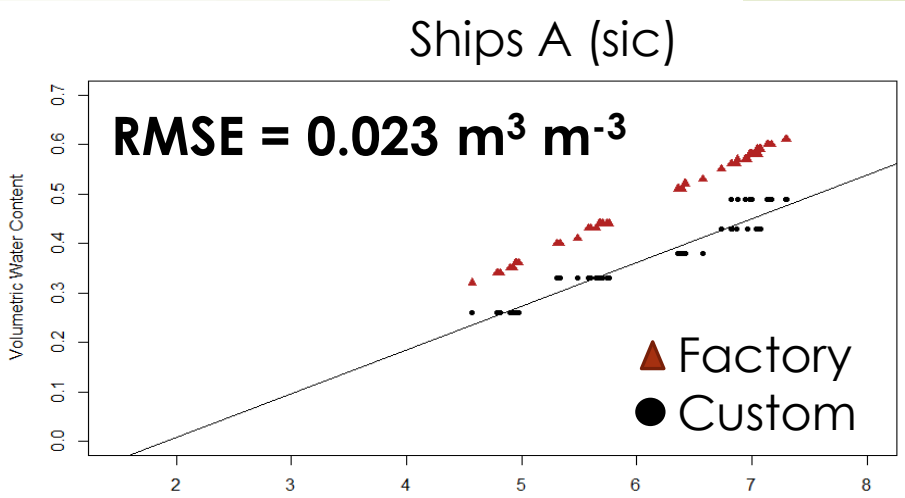
Hydra Probes

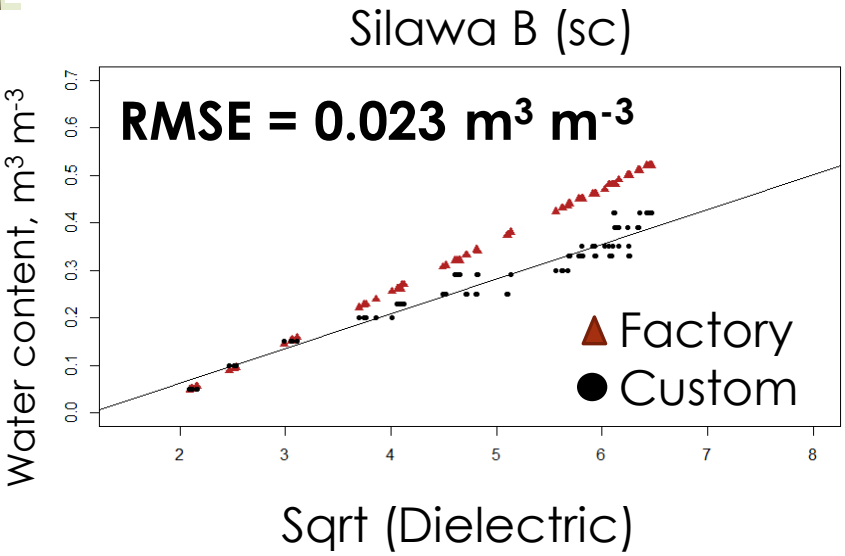
Soil cores at dry and wet periods

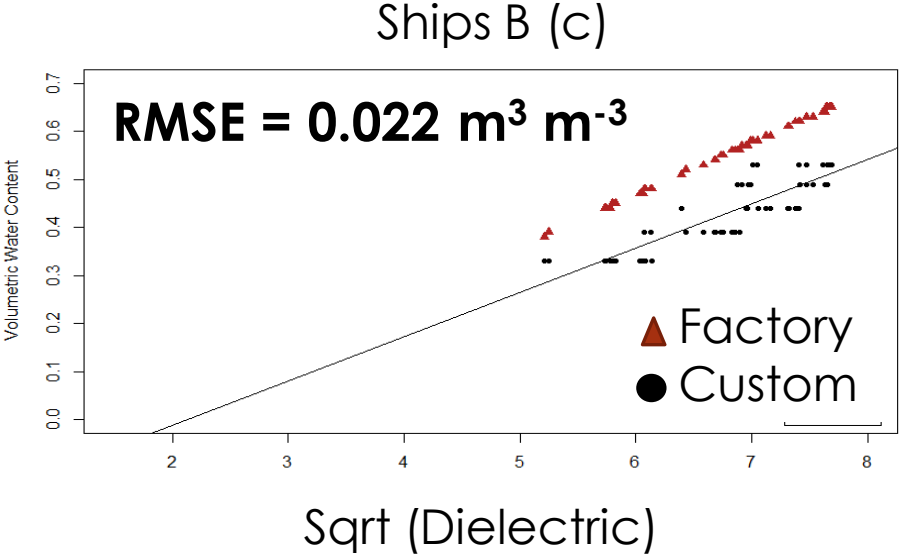


Hydra Probe
Soil-Specific Calibrations



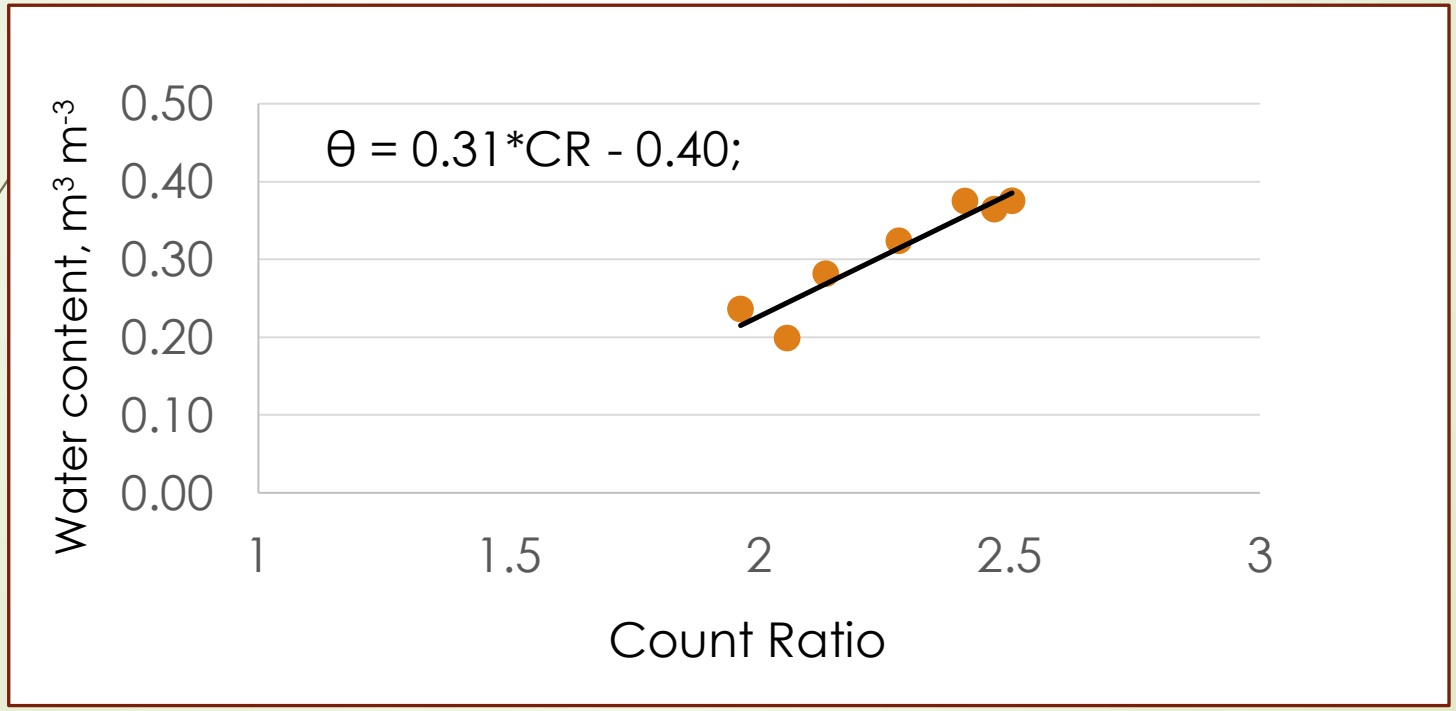




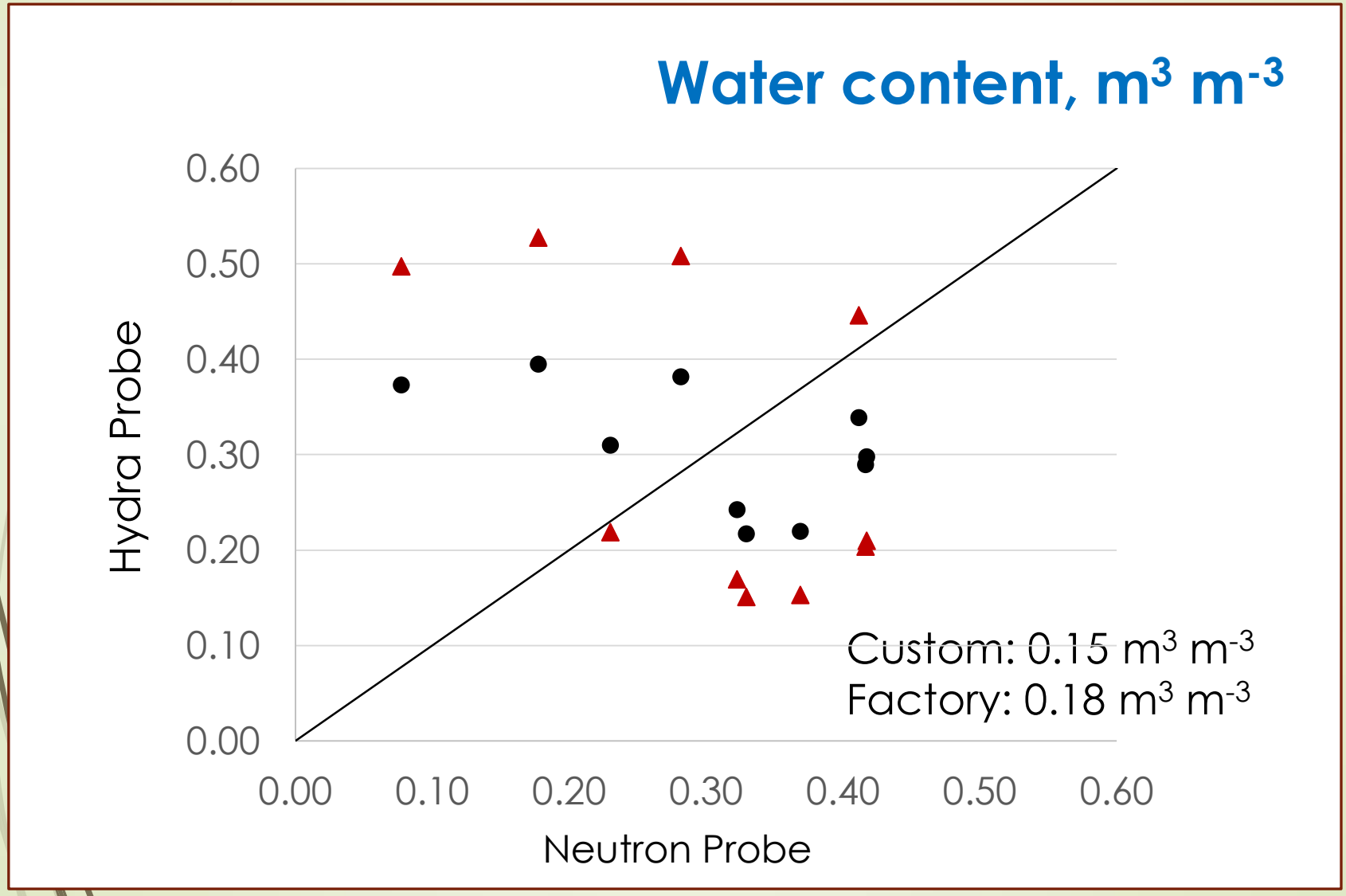


Neutron Probe Calibration

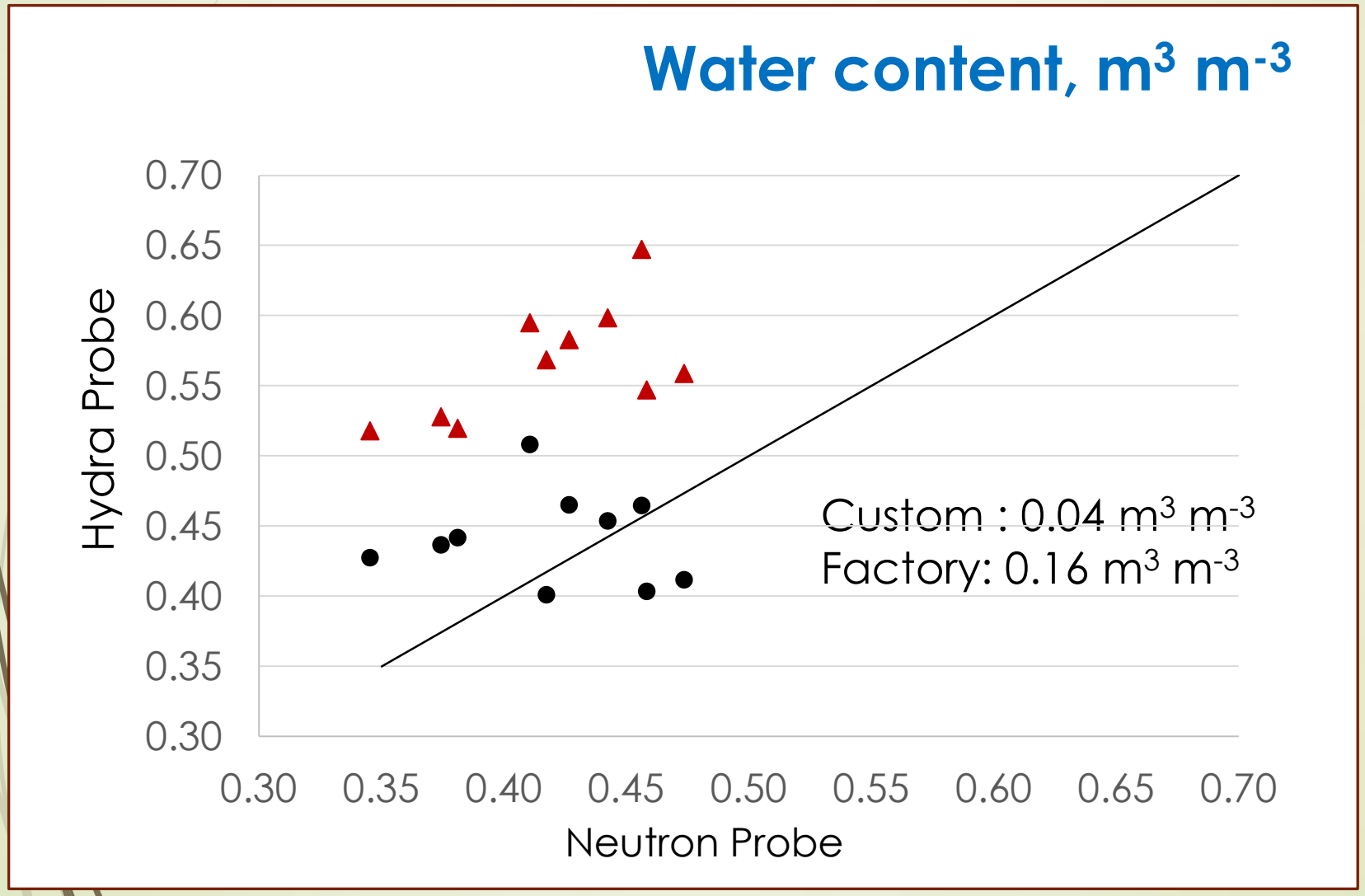
Silawa	Ships
RMSE = 0.025 m^3 m^{-3}	**RMSE = 0.02 m^3 m^{-3}**



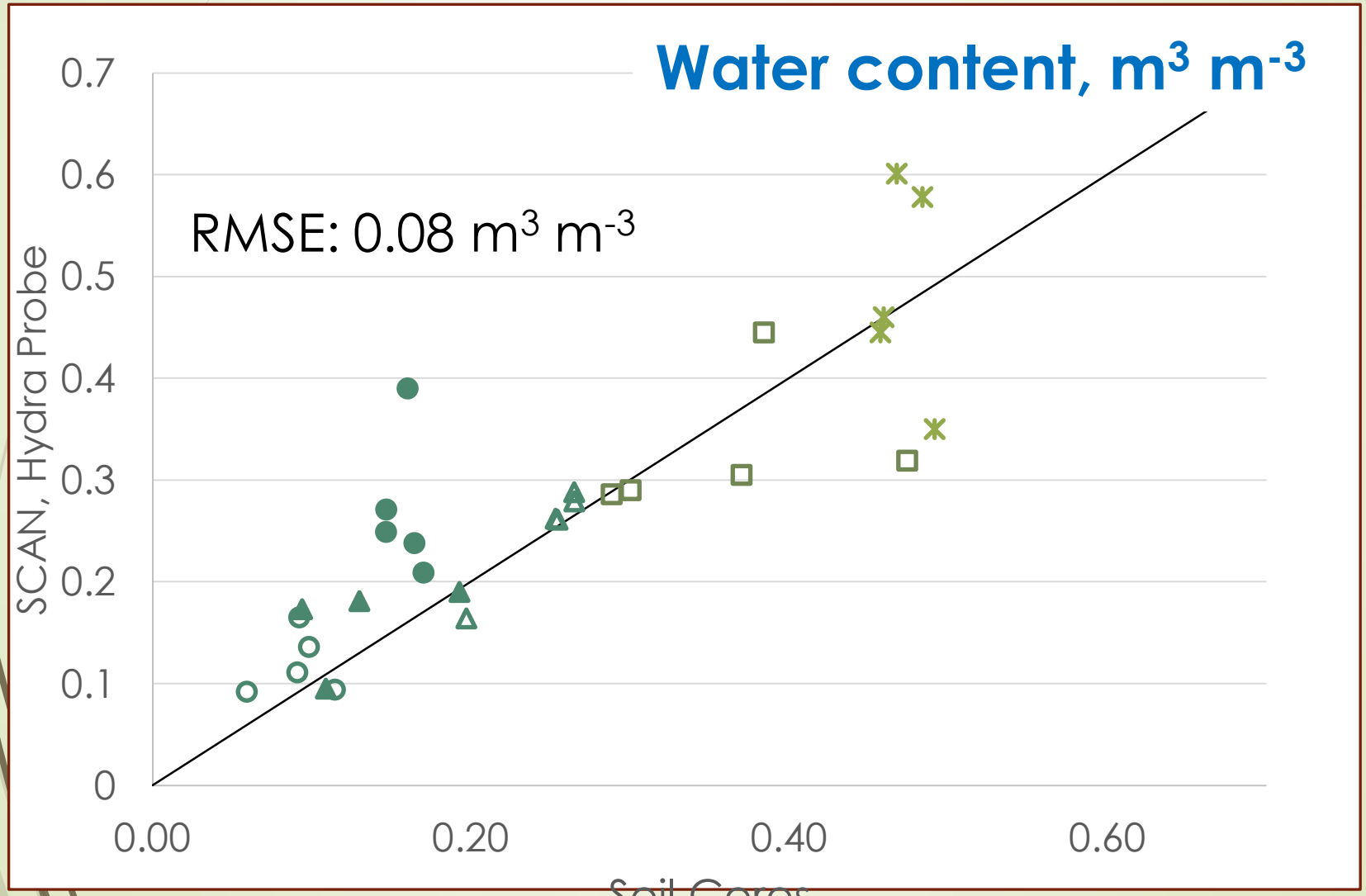
Silawa Comparison



Ships Comparison



Site Comparison, Across Texas



Summary

On average, uncalibrated Hydra Probes aren't so bad, RMSE = 0.08 m^3m^{-3}; but response to changes in water content seem muted

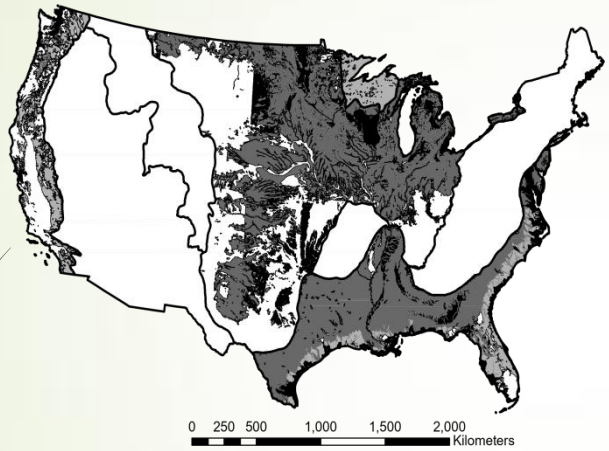
Soil-specific hydra probe calibrations show improvement, 17% Alfisol and 75 % for Vertisol

We will try a post-hoc field calibration results are TBA

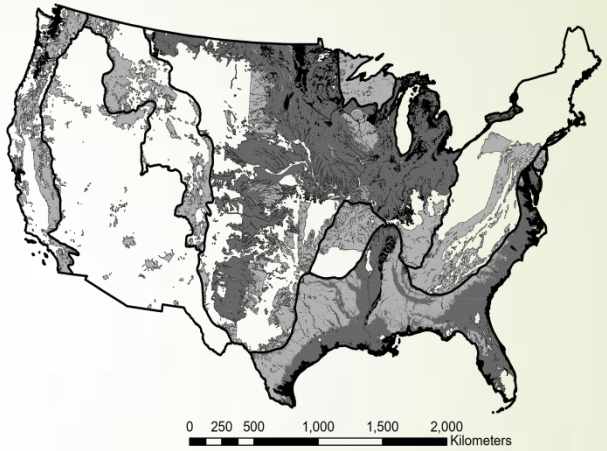
Regardless, results will be posted with SCAN results

Aerial Gamma Radiometrics for Soil Mapping

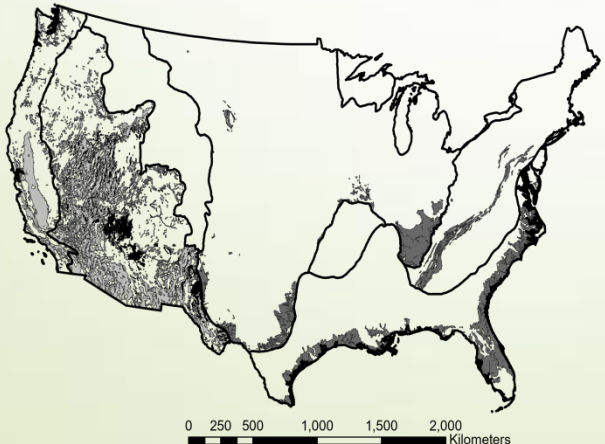
Clay Content

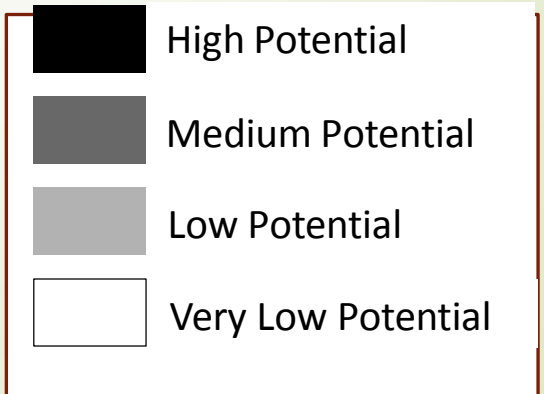


Sand Content

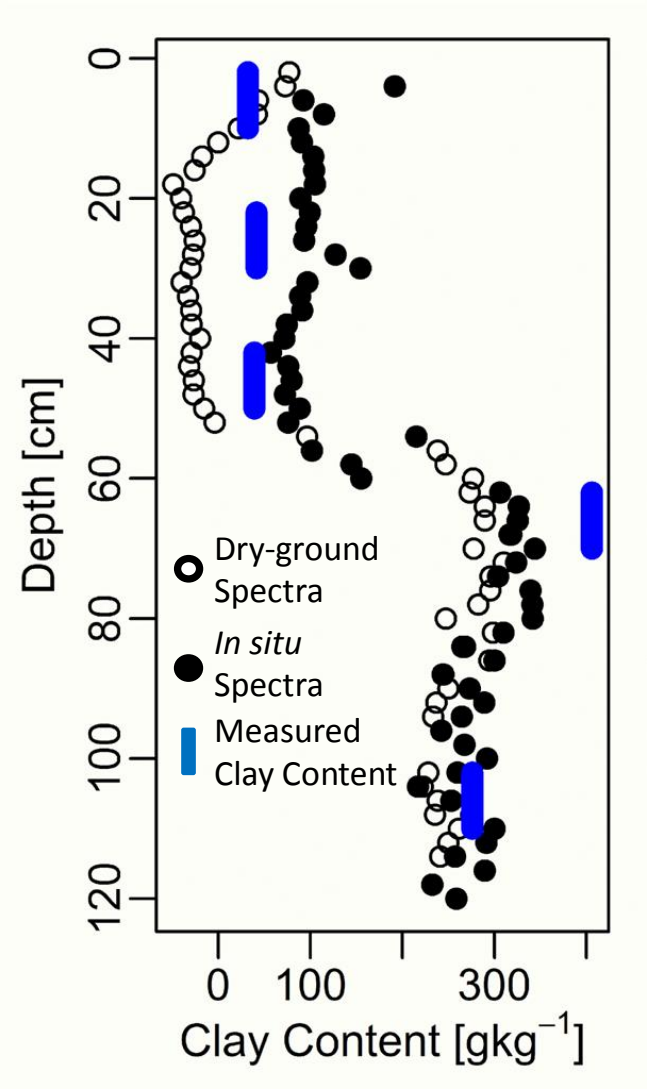


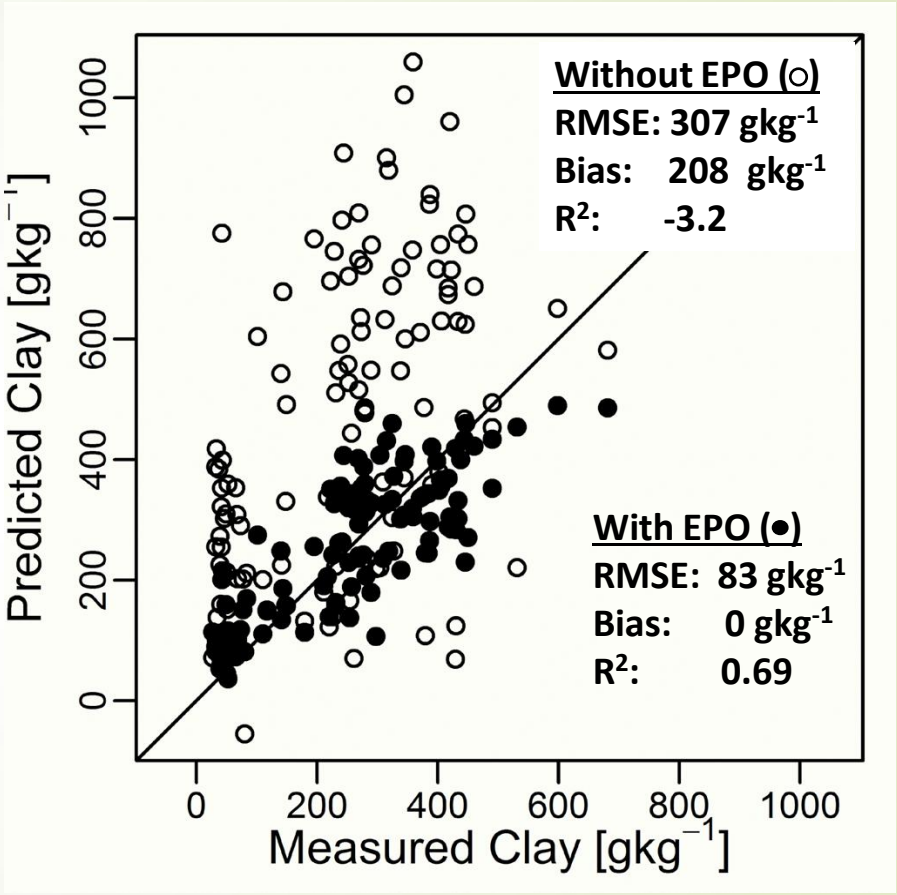
Calcium Carbonate Equivalent





VisNIR Penetrometer





Thank You

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